Power systems engineering is a broad discipline. In general, engineers do not need to use many advanced methods to perform design or solve problems. A solid grasp of fundamental EE skills is enough. The big challenge may be in figuring out the "big picture," framing the problem, and then applying EE fundamentals to solve it.

The following is a summary of some of the basic concepts and skill sets that a system protection engineer makes use of:

**Circuit and Network Analysis:**
- Node & Mesh Equations
- Thevenin & Norton Equivalents
- Euler's Identity
- Phasor Analysis
- Impedance, Admittance
- Power and Impedance Triangles
- Calculation of P and Q flows
- Balanced Three Phase Circuits
- Delta ↔ Wye Conversions
- L-N Per Phase calculations

**Power Systems Analysis:**
- Visual solution via phasor diagrams
- Voltage regulation calculations
- Phase shifts in three-phase xfmrs
- Per Unit System
- Symmetrical Components
- Formation of pos-neg-zero networks
- Short-Circuit Calculations

**Basic Magnetic Circuits:**
- \( B, H, i, e, \lambda, \theta \) relationships
- Basic magnetic circuits
- Lenz's Law for induced voltage
- Ideal Transformer, Polarity Markings
- Basic Transformer Equivalent Circuits
- Ampere's Circuital Law (for current measurement)

Some of these are basics from prereq courses. Some are concepts that are being covered in your senior year power systems courses. Some may be new concepts. Please take an active part in giving me feedback on what you have or haven’t had, and if you’re having any difficulty with the homework problems. If needed, I can spend more time with these concepts in lecture, arrange office hours or help sessions, etc.

Note that we will either review or provide coverage for most of these concepts during the first 3-4 weeks of the class, as we introduce the fundamentals of power system protection.